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ABSTRACT

A summary and analysis of the significant literature on evaluation of vocational education, focusing on a limited number of evaluation efforts that reflect strategies typically used in vocational education, is presented in this information analysis paper. The paper is intended for curriculum developers, teachers, and administrators in vocational education, state education department staff, and researchers. The following topics are discussed: purpose of evaluation, evaluation defined, evaluation models, needs assessment, former student follow-up (including definition, objectives, groups to involve in conducting follow-up studies, groups to follow-up, techniques, instrument development, and conducting the follow-up), employer surveys, student/parent surveys, cost benefit studies, information systems, state advisory council studies, and standards and reviews. Recommendations based on a review of most of the materials included in the references list on vocational education program evaluation include the following: program evaluation in vocational education needs (1) to be a continuous effort, (2) a more systematic approach, (3) more emphasis on cost analysis, (4) assessment of personnel development, (5) development of specific and measurable program objectives, (6) research in all areas of methodology, (7) more people involved, (8) systematic and comprehensive information systems for collecting information, and (9) emphasis on both theoretical and practical evaluation bases. (TA)

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PROGRAM EVALUATION IN VOCATIONAL EDUCATION: A REVIEW

written by

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FOREWORD

The Educational Resources Information Center for Career Education (ERIC/CE) is one of sixteen clearinghouses in a nationwide information system that is funded by the National Institute of Education. The scope of work for ERIC/CE includes the fields of adult-continuing, career, and vocational-technical education. One of the functions of the Clearinghouse is to interpret the literature that is related to each of these fields. This paper on program evaluation in vocational education should be of particular interest to adult educators, business/industry personnel managers, and middle-aged Americans.

The profession is indebted to Floyd McKinney, Texas A&M University & Institution for his scholarship in the preparation of this paper. Recognition is also due John A. Klit, Illinois State Department of Education, and Kay Adams, The Center for Vocational Education, The Ohio State University, for their critical review of the manuscript prior to its final revision and publication. Wesley Budke, Vocational Technical Specialist at the ERIC Clearinghouse on Career Education supervised the publication's development. Madelon Plaisted and Jo-Ann Cherry coordinated the production of the paper for publication.

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Executive Director
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ABSTRACT

A summary and analysis of the significant literature on evaluation of vocational education, focusing on a limited number of evaluation efforts that reflect strategies typically used in vocational education, is presented in this information analysis paper. The paper is intended for curriculum developers, teachers, and administrators in vocational education; State education department staff; and researchers. The following topics are discussed: Purpose of evaluation, evaluation defined, evaluation models, needs assessment, former-student followup (including definition, objectives, groups to involve in conducting followup studies, groups to followup, techniques, instrument development, and conducting the followup), employer surveys, student/parent surveys, cost benefit studies, information systems, State advisory council studies, and standards and reviews. Recommendations based on a review of most of the materials included in the references list on vocational education program evaluation include the following: Program evaluation in vocational education needs (1) to be a continuous effort, (2) a more systematic approach, (3) more emphasis on cost analysis, (4) assessment of personnel development, (5) development of specific and measurable program objectives, (6) research in all areas of methodology, (7) more people involved, (8) systematic and comprehensive information systems for collecting information, and (9) emphasis on both theoretical and practical evaluation bases. (TA)

Descriptors:

*Vocational Education; Curriculum Development; Educational Administration Evaluation; *Educational Assessment; *Program Evaluation; Cost Effectiveness; Program Costs; *Program Validation; Summative Evaluation; *Evaluation Methods Surveys; Needs Assessment; Vocational Followup; Research Needs; Literature Reviews; Models

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INTRODUCTION

Demand for high quality vocational education is increasing daily. Persons involved in these programs must have valid and reliable information, both to assess the quality of current programs, and to plan the additional programs needed.

The need for evaluation of vocational education programs was emphasized in the Report of the President's Panel of Consultants on Vocational Education in 1963 and in the Vocational Education Amendments of 1968. Public Law 94-482, Education Amendments of 1976, calls for federal and state evaluations of all programs which purport to teach entry level job skills. As a result of these and other developments, students, employers, and educators, as well as the general public, have become increasingly aware of the role of vocational education in preparing people for work.

Program evaluation must be an integral and continuous part of vocational education. Unless programs are properly evaluated, educators will have no basis for making decisions on program development and revision. As the public's dollar investment in education increases, there is a growing demand that education be efficient and effective. For vocational educators, the issue is not whether to evaluate, but how.

Much effort already has been spent in evaluating vocational education programs. A review of these efforts reveals that, while many of the strategies and techniques are similar, there is no comprehensive and systematic approach to evaluation. Wedemeyer (1969) notes several reasons for the lack of attention to evaluation:

1. Program developers do not view evaluation as a necessary part of their professional activities.

2. Evaluation receives lower priority than other activities.

3. Evaluation receives minimal financial support.

4. Program developers often are not adequately prepared to conduct evaluations.

5. Evaluation is threatening to many educators.

At a National Seminar on Research in Evaluation of Occupational Education at North Carolina State University (1968), evaluation was subdivided into a number of problems, including the following:

1. The goals and objectives of vocational education have not been succinctly stated or clearly defined.

2. There are few valid and reliable instruments for assessing behavioral change.

3. The outcomes of vocational education are diverse and difficult to measure.

4. Evaluation efforts frequently are not used as information by management.

The magnitude of the evaluation problem is further revealed in the Ball and Scarvia (1975) study dealing with current evaluation practices in adult technical education programs. Their findings show that most evaluations obtained data only through questionnaires and interviews of program participants. One fourth of the evaluations were unplanned and of poor quality.

This paper is a summary, and analysis of the significant literature on evaluation of vocational education. Time and resource did not permit review of all evaluative studies of vocational education. I have emphasized a limited number of evaluation efforts that reflect strategies typically used in vocational education. The references will guide those persons interested in further investigation to additional resources.

PURPOSE OF EVALUATION

Evaluation is an ongoing activity, and, as Barkley (1974) notes, it is here to stay as long as educators use public funds and work with people and people's children.

Dunn (1975), applying a general definition developed by Stufflebeam (1971), proposes that the purpose of evaluation in vocational education is to provide information to resolve vocational decision-making problems. Barkley, also reflecting the viewpoint of Stufflebeam, further notes that evaluation is not to prove, but to improve. Barkley contends that evaluation for improvement purposes operates with two assumptions: (1) the intention of the evaluation program is as clear as the conceptual framework on which it is based, and (2) the participants in the program are as anxious to provide information as the evaluators are to get it.

EVALUATION DEFINED

Evaluation has multiple meanings. Stevenson and Ward (1973) defind evaluation as the phenomenon of examining data that reflect a situation and judging whether or not that situation is acceptable. Evaluation as defined by Guba and Stufflebeam (1970) is the process of obtaining and providing useful information for making educational decisions. The Phi Delta Kappa Commission on Evaluation (Stufflebeam, 1971) found evaluation to be the process of delineating, collecting, and providing information useful for judging decision alternatives. Several writers contend that evaluation must be continuous. As Wedemeyer (1969) notes, evaluation should not be a one-shot process.

EVALUATION MODELS

Stevenson and Ward (1973) established three characteristics of an evaluation system that could be measured to determine the worth of that system: validity, effects, and cost. *Validity* was defined as a measure of how accurately the data collection by the system reflect the true vocational education situation. *Effects* was defined as a measure of the impact of the results of evaluation on vocational programs. *Cost* of the system was prorated according to the intended effect of the system.

McKinney, Mannebach, and Neel (1972) used an evaluation system in central Kentucky that emphasized students' attainment of behavior as stated in the objectives. The evaluation system was a locally directed, state-assisted effort. Byram (1971) notes that the advantage of a locally directed evaluation is that persons involved are those responsible for improvement of the program. McKinney and Mannebach (1973) also used student committees to assist in the evaluation. Figure 1. is a diagram of the model developed by McKinney, Mannebach, and Neel.

Denton (1973) used this system to explain the types of information and methods which can be used to obtain information at each phase of the model.

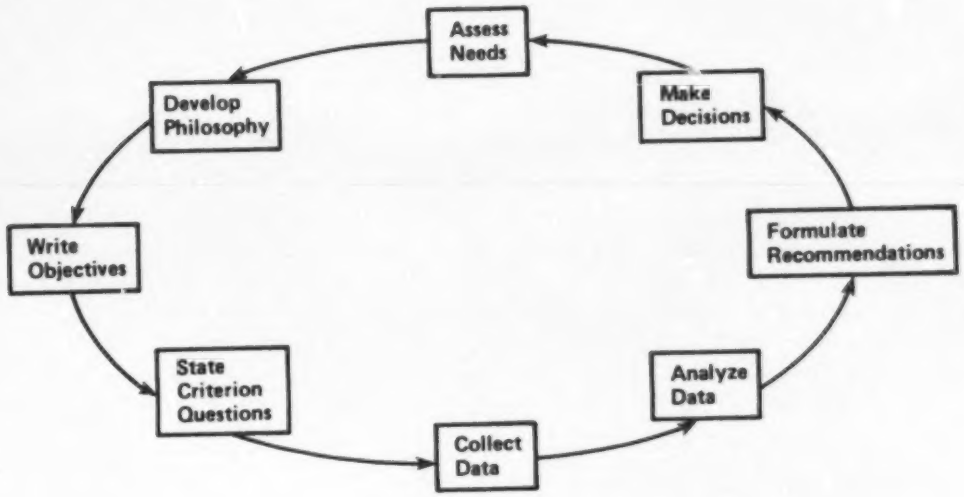

Figure 1.

As schools have moved toward implementing evaluation systems, the development of clearly stated objectives has received increasing emphasis. Mount Jacinto College (1972) has worked with measurable institutional objectives in moving toward accountability. McKinney and Mannebach (1971) conducted a workshop to assist participants in developing objectives stated in performance terms. A follow-up study to the workshop was carried out to determine participant activities regarding the development of objectives.

After spending nearly three years in formulation, Starr and Dieffenderfer (1972) proposed an evaluation system designed to assist vocational education management in program planning, accountability, and reporting responsibilities. Providing a core of evaluative data for program planning and evaluation, the system uses a management-by-objectives approach to program planning, but is adaptable to other approaches as well.

The Fresno County Department of Education (1972) has developed a system for Program Evaluation at the Performance Objective Level I (PEAPOL). The system is designed to allow vocational teachers and district administrators to monitor closely student progress

and costs incurred in individual classrooms. The system generates reports by linking progress data to cost data at the performance level of instruction.

Smith (1971) developed and tested a statewide system for evaluating vocational education programs. The system consists of two subsystems, one dealing with decisions about the quantity, type, and location of programs and the other dealing with decisions about the quality of existing vocational programs.

A model for evaluating the distributive education program in Arizona has been developed by Arizona State University (1975). Students, teacher-coordinators, and business and industry leaders were surveyed to determine if their needs were being met by the existing program. The model allows occupational assessment of the market/distribution cluster and an operational definition of cluster parameters. Included in the model are the following sequential steps:

1. Identify, goals, purposes, and objectives of the program to be evaluated and the objectives of the evaluation.

2. Develop measurement criteria and design instruments to collect and measure needed data.

3. Determine a valid sampling technique and collect data.

4. Analyze data in terms of the objectives of the evaluation.

5. Report on findings and implications.

6. Make decisions for program modification based upon the findings.

A computerized model to evaluate local vocational education programs in relation to the various functions of vocational education has been developed by Branch (1972). The evaluation model is in the form of a computer print-out from individual vocational education programs and from each function within a program. The model offers an unbiased view of a vocational education program as it functions, notes recommended courses of action for areas of weakness, and provide an accurate job market anlaysis. The primary purpose of the model is to audit a program. A variety of instruments collect data for the functions of vocational education. Functions evaluated within the model are (1) population needs, (2) job markets, (3) job performance, (4) curriculum

resources, (5) program planning, (6) program review, (7) promotion, (8) recruitment, (9) counseling, (10) instruction, (11) placement, and (12) evaluation.

The Ohio State Department of Education's (1974) Program Review for Improvement, Development, and Expansion in Vocational Education and Guidance is composed of the following six components.

1. Administrative review-focuses on board policy, administrative procedures, finance, program development, instruction, staff personnel, school-community relations, and evaluation and accountability.

2. Process variable review-instructors use a lay advisory committee to react to the variables of an instructional program.

3. Product review-identifies successes achieved by vocational education graduates.

4. Cost analysis review-identifies instructional cost of operating an instructional program by class and generates cost per pupil per program and class.

5. Availability and impact review-conducted periodically by the vocational education planning district personnel to use local resources for determining community needs.

6. Acceptance and congruence review-uses instruments to examine student interests and attitudes and parent attitudes.

Bell's evaluation model reported in Barkley (1974) focuses on performance of students and transactional evaluation. Transactional evaluation judges the perceptions people have of a program. Bell contends that the ultimate testing of any program lies in the perception of those who work in and around it.

Finch and Bjorkquist (1975) suggest that context and input measures offer potential for vocational education program evaluation (see figure 2). According to Finch and Bjorkquist, context evaluation determines whether or not a program should be offered and, if so, what should its parameters be. Input evaluation helps to decide what resources and strategies will be used to achieve program goals and objectives. Process evaluation is used to determine what effect the program has on students in school. Product evaluation examines the program's effects on former students.

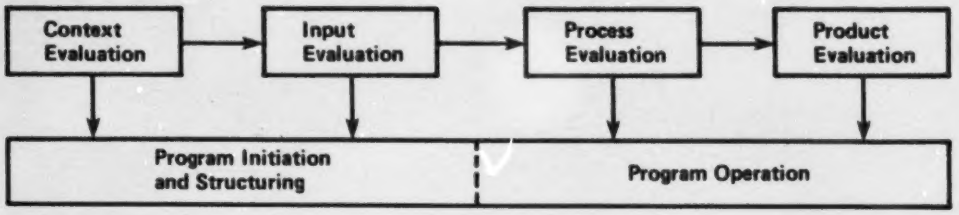

Figure 2.

Elson (1976) has developed a systematic procedure for evaluating the total vocational education program in a local school. The system guidelines are divided into two major sections: (1) curriculum and instruction, including a thirty-two-item rating form to be completed by vocational teachers, and (2) forms and instructions.

The Illinois Department of Adult Vocational and Technical Education (1975) summarizes findings based on on-site evaluations. Their system features local self-study and use of review teams. Areas evaluated include (1) students served, (2) occupational programs, (3) administrative organization, (4) personnel, (5) objectives, (6) evaluation, (7) resources used, and (8) guidance.

Edsall (1973) suggests ten steps to guide local program evaluation. In order of use, they are (1) contacting the state vocational education department, (2) deciding how much to evaluate, (3) selecting the evaluating team, (4) deciding what to evaluate, (5) orienting the evaluation team, (6) providing materials for the evaluation team, (7) collecting and recording information, (8) reporting the results, (9) using the results, and (1) writing the follow-up report to the evaluation team.

NEEDS ASSESSMENT

Determination of needs is vital to the evaluation effort, for identified needs must be reflected in the philosophy and objectives of a program. Kaufman (1972) indicates that identifying needs is measuring the discrepancy between "Where are we now?" and "Where are we to be?" Further, needs assessment must accurately reflect the "real world...." (p. 29)

Owings and Diener (1975) surveyed adults in the Tuscaloosa, Alabama, area to assess opinions and attitudes on postsecondary educational opportunities and programs. From a random sample of approximately 400 individuals listed in the Tuscaloosa telephone directory, 202 individuals were mailed a twenty-seven-item questionnaire. The questionnaires were followed up with telephone calls from interviewers, who recorded the questionnaire responses of the participants. Demographic data reflecting the personal characteristics of the respondents were also collected.

An analysis of population and vocational education enrollment, teachers, and expenditures is included in a publication by the U.S. Office of Education (1971). The report is based on data received from U.S. cities with populations over 250,000. Information is included from forty-five of the fifty-eight largest cities.

Alvir (1976) developed a checklist to aid teachers in identifying needs and priorities of both students and teachers in vocational education programs for deaf secondary school students. Alvir also designed a survey questionnaire to elicit information from the student that reveals learning and learning potential.

Postsecondary education needs were assessed by Stelzer and Banthin (1975) in northeastern New York State. The study was designed to provide adult education planners with information for program planning and evaluation. Questionnaire respondents included 1,055 individuals from four subregions. Data analysis focused on (1) overall interst/potential market, (2) knowledge factor, (3) motivation factor, (4) background characteristics of interested individuals, (5) approach-avoidance model (approach), and (6) approach-avoidance model (avoidance).

A survey of the four-county area surrounding Waco, Texas, was designed by Ferguson (1975) to assess education and training needs and interests of the local population and business community. A business and industry employee skill needs survey was developed to obtain data in the following categories: (1) general information, (2) employee information, (3) entrance requirements, (4) problems, and (5) supportive education programs. In another phase of the study, sampling units of approximately equal population size were developed based on census tract data. The survey employed a multistage cluster sampling process with stratification for counties included in the survey area. Primary sampling units of approximately equal population size were developed within the counties based on census tract data from the 1970 census.

Randomization occurred at the following stages:

1. Selection of primary sampling units within counties based on percentage of the total population of the four-county area in each county.

2. Selection of the residence within the field and the use of random tables.

3. Random selection of the survey respondent when more than one person qualified for inclusion in the sampling at the residence.

Information was collected about the availability, costs, and entrance requirements of adult education programs, obstacles and inducements to enrollment, interest in specific program types, attitudes toward instruction and classroom practices, effective advertising methods, and attitudes toward adult education and vocational education.

Alfaro (1974) developed a needs assessment system for occupational education in two community college districts in Florida. The system includes (1) a statement of mission objectives, (2) performance requirements, and (3) a mission profile representing the sequence of functions and a function flow-back diagram showing interrelationships between the various steps of the system.

Young (1972) reported on the role of staffing information in vocational education planning. The report examines the concepts of staff supply and demand and the sources of relevant information and methodologies for its estimation, considers criteria for determining vocational education priorities, and describes a method for allocating resources among vocational programs.

Adams (1977) conducted a national assessment of vocational education needs in large cities. The perceptions of needs by educators, students, and representatives from the working community were explored through an open-ended mail survey, personal interviews, and literature review. The information generated through these methods were then synthesized into specific statements of need, clustered under thirty general goals in areas such as basic skills, collaboration with the community, funding base, vocational guidance, and community relations. National priorities for vocational education programs in large cities were then determined by asking vocational education directors and central office staff members to rate the statements as higher, medium, or lower priorities.

These priorities were also compared in terms of city size, geographic location, and minority concentration to determine if different types of cities have unique needs.

FORMER-STUDENT FOLLOW-UP

With the increasing emphasis on the outcome of the vocational education system as a gauge of the effectiveness of the program, there has been more following up of former students as an evaluative strategy.

WHAT IS A FOLLOW-UP STUDY?

A follow-up study accumulates pertinent data from or about individuals after they have had similar or comparable experiences. Follow-up implies the collection of data about something that has already taken place. Former students are asked to reflect on how the program in question either prepared them or failed to prepare them for their future work.

Whether or not a follow-up study should be conducted depends on the objectives of the evaluation. Once these objectives have been determined, the kinds of information needed to meet program objectives can be identified. Several techniques and procedures may be necessary to get the needed information. A former-student follow-up study may be one of the selected procedures for information gathering.

OBJECTIVES

Specifying objectives for the follow-up study is important because of the relationship of the objectives to the kinds of data the investigator needs to collect. Wentling and Lawson (1975) have suggested several objectives for a follow-up study, including the following:

1. To determine career patterns of former participants of various programs.
2. To determine immediate demand for positions within the community.
3. To determine the mobility of program graduates.
4. To determine the adequacy of the educational or training program in preparing individuals for job entry.

5. To determine the adequacy of preparation for entry into advanced training, such as community college, industrial training program, university, or adult education program.
6. To determine adequacy of ancillary services, such as guidance counseling, and placement.
7. To determine realistic job descriptions for positions obtained by former students or trainees.
8. To emphasize the primary objective of career education to staff and students.
9. To provide information for required reports. (pp. 124-128)

In evaluating the first year vocational education programs in Pennsylvania's correctional institutions, Lewis (1974) sought the opinions of the participants. The study objectives were as follows:

1. To determine the relationship between offenders, career goals, and their present vocational courses.
2. To determine offenders' assessment of the value of their vocational course in obtaining employment.
3. To determine how offenders were selected for various vocational courses.
4. To determine offenders' self-assessment of their skill level.
5. To determine the relationship between offenders' self-assessment and instructors' assessment of their skill level.
6. To determine offenders' general atittude toward their course work.
7. To determine the number of offenders enrolled in the vocational programs.
8. To determine self-assessment on the quality and status of vocational programs.

GROUPS TO INVOLVE IN CONDUCTING FOLLOW UP STUDIES

McKinney and Oglesby (1971) suggest the involvement of the counseling service, vocational education teachers, the school administration, students, the school governing board, and the citizens advisory committee. They also note that each school system is unique and that other groups may need to be involved in the effort.

GROUPS TO FOLLOW UP

Wentling and Lawson (1975) suggest that the selection of individuals to be included in the follow-up study is inherent in the

determination of the need and objectives for the follow-up. The importance of determining the groups to follow up is further substantiated by McKinney and Oglesby (1971). Obviously, if the wrong people supply the data, the results will not be valid.

McKinney and Oglesby (1971) suggest that if the picture of the total educational effort is to be realistic the follow-up study must include students who did not graduate as well as those who did graduate. In some schools, dropouts comprise a sizeable proportion of the classes. If this group is ignored, findings could be misleading. Still, many follow-up studies survey only graduates of a program.

Sometimes it is valuable to follow up the total student body of a school or several schools. Grasso (1975) compared graduates from various high school curricula, interviewing a random sample of graduates living within reasonable commuting distance.

The length of time a student has been out of school affects the answers given. McKinney and Oglesby (1971) suggest that only those out of school for at least a year or more should be included in the study. Unfortunately, the longer former students have been out of school, the more difficult it is to separate the value of education from the influence of noneducational activities. Also, the longer students are away from school, the less valid their judgments about the current educational program are likely to be.

TECHNIQUES

Commonly used techniques include the mail survey, personal interview, and telephone interview. The mail survey is most commonly used. Lewis (1974), Hall (1975), Southwestern College (1974), Elstehausen (1973), Brockmann (1972), Fite and Gran (1972) represent studies using the mail survey. In a study by Somers (1971), sampling was used for identifying graduates and dropouts. A random sample of nonrespondents were drawn for follow-up telephone interviews.

The personal interview, when done correctly, collects valuable data. However, this technique is usually expensive. Hall (1975) interviewed a random sample of graduates living within reasonable commuting distance.

INSTRUMENT DEVELOPMENT

Wentling and Lawson (1975) stress the importance of formulating objectives for the follow-up study. From the study objectives, Wentling and Lawson suggest the development of an instrument to collect the needed data. McKinney and Oglesby (1971) indicate that program objectives are the basis for the development of follow-up instrument items. Wentling and Lawson and McKinney and Oglesby review the many problems associated with developing instrument items and with instrument format. The Bockman and Felstehausen (1973) and Hall (1975) studies provide sample instruments.

CONDUCTING THE FOLLOW-UP

Wentling and Lawson (1975), and McKinney and Oglesby (1971) provide considerable information on procedures to use in conducting the follow-up. McKinney and Oglesby suggest the following mailing pattern.

·First mailing :	"Alert" card.
·Second mailing:	Follow-up instrument, cover letter, and return envelope--stamped and addressed.
·Third mailing :	First thank-you (reminder card).
·Fourth mailing:	Second follow-up instrument, second cover letter, and return envelope--stamped and addressed.
·Fifth mailing :	Second thank-you (reminder card).

The Gran (1972) study used a mailing pattern with two-week intervals. At the end of four weeks, all nonrespondents were contacted by telephone.

The Somers (1971) study sampled graduates nationally. Dropouts and nonrespondents were also sampled randomly. Nonrespondents were contacted by telephone.

EMPLOYER SURVEYS

Various methods have been used by vocational educators to secure feedback from employers about the adequacy of former-student preparation. Public Law 94-482 adds impetus to obtaining employer reactions, directing each state to determine "...the extent to which program completers and leavers are considered by their employers to be well-trained and prepared for employment."

Wentling and Lawson suggest the following objectives for an employer survey:

1. To assess performance of former students.
2. To determine how specific program graduates compare with graduates of other training programs.
3. To elicit employer recommendations for improving the occupational program.
4. To determine the recruitment practices of employing agencies.
5. To assess the competency list of a specific course or program.
6. To estimate supply and demand for individuals in particular occupations.
7. To aid the public relations of the educational or training agency or institution. (pp. 166-169)

The New York State Education Department (1974) surveyed the members of the American Society of Travel Agents through a questionnaire. The survey's aim was to determine whether the present secondary programs in New York State provide sufficient career information and adequate preparation for young people to obtain employment in the travel industry. Willett and Piland (1973) surveyed employers identified from a follow-up of graduates. All employers were sent a questionnaire. A sample of these employers was randomly selected for interview, but the investigators found the interview phase time-consuming and difficult to carry out.

In an assessment of the radiologic technology program at Los Angeles City College, Gold (1972) solicited opinions of local hospital administrators to determine the local program's effectiveness. Hall (1975) used personal interviews of employees in a study of machine tool technology and building construction graduates.

STUDENT-PARENT SURVEYS

Because they are most affected and concerned by programs, students and parents are important sources of information in conducting evaluations. Unfortunately their opinions are frequently ignored when information is gathered.

Purrington (1972) examined the expectations and satisfactions of students and their parents at the secondary and postsecondary level in traditional public school, in vocational centers, and in a community college in Florida. The study group was determined by randomly selecting three of five vocational areas of the state and then selecting one vocational center, one traditional high school and one junior high school in each of the three areas.

The acceptance and congruence review component of Ohio's Program Review for Improvement, Development, and Expansion in Vocational Education and Guidance (1974) uses instruments to examine student and parent interests and attitudes. The instruments used are the Ohio Vocational Interest Survey and the Parent and Student Vocational Education Survey. The same instruments were also used by McKinney and Manneback (1972) in the Central Kentucky Vocational Education Evaluation Project.

COST-BENEFIT STUDIES

While cost-benefit studies are important for vocational education, there is a lack of research in the area. The purpose of cost-benefit studies is to determine the relationship between the cost of a program and the benefits resulting from implementation of the program. Through the use of cost-benefit studies, programs that produce the best possible results for the least possible resource outlay can be identified. Some of the methodology used and problems encountered are reported in this paper.

Weiner and Marson (1974) suggest the following outline of the basic methodology for conducting cost-benefit studies:

I. Research type, ex post facto
   (In the Weiner and Marson Study, based on information available on 1973-74 school year, supplemented by projected information)

II. Develop course matrix for program under evaluation
   A. Course number
   B. Course title
   C. Instructor's name and annual salary
      1. Name
      2. Contract salary
      3. State retirement paid by district
      4. Health insurance
      5. Life insurance
      6. Long-term disability
      7. Total contract salary

D. Number of students in course
E. Program majors
F. Course hours per week
G. Classroom
H. Percentage of course used for program under evaluation
I. Number of course hours per week taught by instructor
J. Facilities cost per course
K. Facilities cost per student
L. Facilities cost per student enrolled in program under evaluation

III. Determine economic cost input
A. Instructor
B. Building
C. Equipment
D. Student
E. Auxiliary
F. Administrative

IV. Determine economic benefit input
A. Increased tax revenues
B. Increased earnings to the individual
C. Increased productivity--assumed to be the same as item B
D. Increased employment

V. Develop cost benefit ration based on economic cost and benefit figures obtained

Wilson and Wikry (1971) have indicated some of the problems associated with costs. These problems include (1) adequate and dissimilar accounting systems, (2) lack of uniformity and precision, (3) difficulty in knowing how a program's costs vary with expansion and contraction of variable inputs, and (4) difficulty of estimating costs arising from student's foregone earnings.

Estimating benefits that accrue to a student over a lifetime as a result of training also presents problems. Wilson and Wikry (1971) include the following as problems associated with estimating benefits:

1. Lack of perfect foresight regarding a student's future income and the temporal pattern in which it will accrue.
2. Difficulty of ascribing extra income trainees may earn in later life solely to the training they receive as opposed to other characteristics, such as previous training, intelligence, and motivation.

3. Problem of comparing and aggregating income received at widely different times in the student's lifetime.

In addition, Wilson and Wikry (1971) note that the quantification of such factors as opportunities for further training, intergenerational benefits, and increased personal satisfaction is almost impossible.

Barsby (1970) notes that measures of effectiveness selected to evaluate a program are limited only by the resourcefulness of the investigators. The following measures of program effectiveness are suggested by Barsby (1970).

1. Academic improvement between pre- and post-program tests.
2. Skill improvement between pre- and post-program tests.
3. Absolute levels of achievement in both academic and skill tests at end of program.
4. Percentage of persons completing program who are placed in occupations using skills for which they had training.
5. Percentage of persons completing program.
6. Percentage of persons completing program who are placed.
7. Employment/unemployment experience following training (both absolute and relative to nonparticipants).
8. Opinions of program graduates as to how well the program prepared them for future employment.
9. Opinions of the immediate supervisors of program graduates on how well the program prepared the graduates for employment (both absolute and relative to nonparticipants).
10. Extent to which program is serving those persons for whom it was designed.

The problems associated with "before and after" analysis (in which the participants serve as their own control group) are discussed by Barsby (1970). He agrees with others that it is extremely difficult to show that improvements experienced by program participants in earnings and employment result from participation in the program and not from other causes. Understanding that the ideal control group is available, Barsby suggests using the following groups.

1. Those who entered the program but did not use the training.

2. Those who entered the program but dropped out before completion.

3. Those who applied for the program but did not show up.

4. Those who were registered with the employment service as needing jobs but did not apply for the program.

5. Friends and neighbors of program participants.

Stromsdorfer (1972) contends that the use of control groups, adequate sampling procedures, adjustment for nonresponse bias and self-selection bias, and random probability samples of the population of interest are absolute necessities. In his *Review and Synthesis of Cost-Effectiveness Studies of Vocational and Technical Education*, Stromsdorfer suggests that cost-effectiveness studies should use both tabular and regression analysis.

INFORMATION SYSTEMS

Vocational educators have longstanding concern for the development and use of meaningful information systems. However, there are few examples of operating systems that are effective and efficient.

To enable better planning and evaluation of vocational education programs at the state level. Young (1972) developed a mathematical formula for allocating resources to local education agencies which would reflect (1) staffing needs, (2) vocational education needs, (3) relative ability to pay, and (4) excess costs.

Latta and Schmidt (1972) report on a general model for a statewide management information system for vocational and technical education in Florida. The components included in the system are (1) student data, (2) instructor data, (3) program course data, (4) space facility use, (5) student placement and follow-up, and (6) fiscal data. For optimal results from the system, Latta and Schmidt note that vocational educators at all levels and leaders in industry must be involved. Latta and Schmidt also suggest that relevant information for decision-making in vocational and adult education be provided only when the enrollment system is aligned with public and private employment services, together with subsystems in industry.

The Massachusetts State Department of Education (1974) designed a Management Information System for Occupational Education. The data system was designed to collect and store basic census data (mandated state and federal) for all occupational programs in Massachusetts Division of Occupational Education, including the annual federal reports. The data system related programs, enrollments, and costs to job-entry skills acquired by program completers in twenty program areas.

The Tennessee Occupational Research and Development Coordinating Unit (1976) developed a model regional information system for vocational-technical education, including the following:

1. Regional information system data sources.
2. Regional information coding system.
3. Selected data by county.
4. Occupational demand subfiles.
5. Program cost projections.
6. Sources of occupational training.
7. Evaluation of vocational programs and of employment by secondary area vocational technical school graduates.
8. Employment status according to secondary and area vocational-technical school graduates.
9. Facilities and equipment.
10. Rules, regulations, and certification.
11. Individual and composite data packs.

Oliver (1973) developed a management information system for planning and evaluating vocational education programs in Virginia. The system is divided into a microsystem, primarily concerned with guidelines and systematic procedures at the state level, and a microsystem emphasizing the assessing, planning, and programming of individual vocational education programs in local schools.

Using information from the U.S. Office of Education, State Vocational Education agencies, the Census Bureau, and the U.S. Department of Labor, Lee (1976) has reported on the status of vocational education and provided conclusions and interpretations.

STATE ADVISORY COUNCIL STUDIES

Each of the state advisory councils issues annual reports on vocational education. In addition, many of the councils also issue special reports on various aspects of vocational education. The

evaluative strategies used to obtain the information needed to serve as a basis for the council reports is varied.

The Kentucky State Advisory Council implemented a statewide evaluation system developed by Adams and McCaslin (1976). The system provides a vehicle for advisory committees to provide advice to vocational educators. The system has four stages:

1. Orientation to the evaluation process.
2. Investigation of vocational education programs by interviewing vocational educators, vocational students and former students, and local employers.
3. Interpretation of the interview information into an evaluation profile and report which identifies the major needs for improvement, recommendations, and commendations.
4. Communication of the results to vocational educators.

The system provides information for three levels of decision-making: local, regional, and state. The system focuses on three major evaluation areas: relevance of content, job entry skills, and employability skills.

The South Carolina State Advisory Council on Vocational and Technical Education employed an outside consulting firm to conduct an evaluation effort. Questionnaires were sent to 10,000 of the largest employers in the state to determine their perspective of vocational and technical education in South Carolina.

In the Seventh Annual Report of the Oklahoma State Advisory Council for Vocational-Technical Education, the Council reviewed the state's goals and priorities, cited examples with which people and their needs were served, and made recommendations and commendations. The report also contains a digest of comments made at regional meetings with school administrators.

As a basis for its January 1975 report, the Washington State Advisory Council on Vocational Education conducted a study of vocational education success measures and related concerns in Washington State. The study was based on samples of employers, graduates of vocational programs, current students in vocational programs, and local advisory committee members. The sample included one supervisor or manager from each of 144 firms, representing a cross-section by geography, size, and institutional type.

The sample of current students in vocational education was obtained by selecting thirty-eight vocational classes from a variety of

subject areas. Designed to reflect the enrollments of the state as a whole, the sample of students from the various types of institutions and from rural, suburban, and urban communities generally reflected statewide enrollments in these same categories. All students attending class on the day designated for the survey were included in the sample. The advisory committee members associated with each of the thirty-eight vocational classes were asked to respond to a written questionnaire.

Procedures used for most state advisory council reports are similar to those used by Strong and Jarosik (1972) in preparing the 1972 report for the Louisiana State Advisory Council for Vocational and Technical Education. The investigators used existing data to prepare the report.

Kraft (1971) conducted a comprehensive study in preparing the 1971 report for the Florida State Advisory Council on Vocational and Technical Education. The study evaluative strategies included cost-benefit analysis and the securing of opinions of personnel in business and industry about the vocational education program and its graduates. Questionnaires and sample interviews were used to collect data.

In a study to determine the effectiveness of advisory committees in Florida, Danenburg (1975) randomly sampled members of committees. Data were analyzed by cross-tabulations, indicating the relationship between participants' self-reported effectiveness rating and their responsiveness on committee activities, and by a frequencies program indicating the practices performed most often by each type of committee.

STANDARDS AND REVIEWS

STANDARDS

In an attempt to measure desired program characteristics, the U.S. Office of Education designed a measurement instrument for use by school boards, advisory groups, faculty, students, and the general public in evaluating vocational and technical education programs. Desired program characteristics are presented in checklist format and may be arranged along a five-point rating scale to ascertain the degree of agreement with specific characterisitcs.

The North Dakota State Board for Vocational Education (n.d.) has developed an instrument to assist schools and other institutions

to determine specific needs of their vocational programs and to provide the State Board with accountability data for program development. The instrument is divided into twelve sections: (1) philosophy and objectives, (2) curriculum, (3) instructional staff, (4) administration, (5) physical facilities and equipment, (6) instructional materials and supplies, (7) guidance, (8) community involvement, (9) student organizations, (10) advisory committees, (11) students with special needs, and (12) occupational experience. Detailed criteria for each section are listed, with ratings to be indicated on a five-point continuum ranging from major improvements needed to no improvements needed.

The American Vocational Association (1971) has developed evaluative criteria and guidelines for standards and procedures that could be applied to vocational education at all levels. The guidelines, criteria, and evaluation methods presented are divided into two major categories: institutional and program. Items within each category are grouped under the following topics: distinguishing characteristics, objectives, and structure and means. Each item is characterized in an initial statement, followed by guidelines for identifying and evaluating the characteristic. Forms of institutional and individual self-evaluation are also included.

The Division of Vocational Education, Arizona State Department of Education (1973), designed an instrument for use by local education agencies in assessing vocational education programs. The instrument is designed to facilitate identification of program needs and is divided into five parts: (1) program planning, (2) program support, (3) student services, (4) instruction, and (5) evaluation. There are criteria and rating scales for each aspect of the program that is assessed.

Meyer (1972) developed a guide for use by Texas school administrators in developing and operating programs of vocational education for handicapped students.

REVIEWS

Dobrovolny and Stark (1975) conducted a study to determine how the Illinois community colleges develop and approve vocational-technical education programs. The study was conducted by mail questionnaires and by on-site visits.

The Comptroller General of the United States (1972) reviews programs for the U.S. Congress. One such review assesses the merits of vocational education programs receiving federal funds, and identified

existing problems in California, Michigan, Ohio, and Pennsylvania. Information was collected and reported under one of three headings: (1) vocational education not reaching all who need it, (2) funds targeted for the disadvantaged miss the mark, and (2) management information incomplete and inaccurate.

Walsh (1974), through the Olympus Research Corporation, conducted an assessment of vocational education programs for the handicapped under Part B of the 1968 Amendments to the Vocational Education Act. The study approach included (1) an assessment of program administration at the state level, (2) a project level assessment of vocational education for the handicapped, and (3) case study interviews with students, parents (or heads of households), and employers. The study focused on twenty-five states selected by a proportionately stratified probability sample. The project sample was divided into two subsamples: (1) representative sample--a total of seventy-four projects selected randomly in nineteen states (those projects existing in individual states), and (2) special sample--a purposive sample of eighteen projects operating in California, Washington, Idaho, Wyoming, and Kansas. The number of projects per state in the nineteen "representative" states was based on each state's proportional contribution to total enrollment in the nineteen states. The case studies of participants, their parents (or heads of households), and employers were selected from projects in North Carolina, New Jersey, Illinois, Texas, and Ohio--all states included in the "representative" sample. The criteria for selecting these states were (1) completeness of state data on projects and participants, (2) size of programs (total state enrollments), (3) representativeness of program types (special, regular, work study, nonwork study, etc.), (4) geographic location, and (5) availability of employers participating in work study and/or cooperative education projects. To select a sample of nonparticipating employers, participating employers were categorized by size and type of industry. By matching other businesses within the locales where the participating employers were located by size and type of industry, a sample of nonparticipating employers was selected.

Brandon (1974) used Project Baseline data and other information to write an overview and informal appraisal of the Manpower Development and Training Act and its amendments.

Numerous national, regional, and professional accrediting agencies use a review team format to assist them in conducting an appraisal of an agency or school to determine eligibility for accreditation. Because of the extensive number of accrediting agencies, no attempt is made in this paper to review their activities.

RECOMMENDATIONS

The following recommendations are based on a review of most of the materials included in the references and my experience in vocational education program evaluation.

1. Program evaluation in vocational education needs to be a continuous effort. Sporadic and "one-shot" evaluation efforts have some worth, but they sometimes force decision-makers to make inappropriate decisions. Quality decision-making depends on a continuous flow of information. Most vocational education programs are continuing; therefore, it is logical that the evaluation efforts also should be continuous.
2. There is a great need for a more systematic approach to program evaluation in vocational education. Too frequently, the evaluation effort includes a follow-up of students during one year, an employer survey two years later, a labor market study three years later, etc. The results of such a study are always in doubt. Decisions tend to be based on the latest study, which is not a composite of all findings. Evaluation needs to be comprehensive and continuous.
3. More emphasis should be placed on cost analysis studies. With limited resources the decision-maker desperately needs this type of information. However, decision-makers must realize that while cost analysis provides objective data, it leaves out some important subjective factors every decision-maker must consider.
4. All institutions and agencies involved in personnel development should assess whether they are sufficiently emphasizing the preparation of personnel. Typically, program evaluation has not received sufficient emphasis at the preservice or inservice vocational education personnel development programs.
5. Development of specific and measurable program objectives is essential in program evaluation. Institutions and agencies need to devote more resources to the development of program objectives. As a significant part of program evaluation, it is important to determine whether or not objectives are appropriate for the situation for which they have been developed.
6. There is critical need for research in all areas of methodology A review of follow-up studies reveals a lack of consistency in the use of acceptable procedures to conduct studies. A review of other areas in evaluation shows similar problems.
7. More people should be involved in evaluation. Staff, students, parents, lay citizens, administrators, and others should assist in planning, conducting, and appraising the vocational education evaluation process.

8. Systematic and comprehensive information systems need to be developed for collecting information about vocational education programs. Program evaluation depends on a continuous flow of reliable and valid information.
9. There is a lack of a concentrated, systematic research and development. Both theoretical and practical bases of evaluation for vocational education need to be emphasized.

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